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(54) Title: ION CONDUCTING COMPOSITE MEMBRANE MATERIALS CONTAINING AN OPTIONAL MODIFIED ZIRCONIUM PHOSPHATE DISPERSED IN A POLYMERIC MATRIX, METHOD FOR PREPARATION OF THE MEMBRANE MATERIAL AND ITS USE

(57) Abstract: The invention provides composite membrane materials comprising a polymer of the state of art uniformly filled with a zirconium phosphate, preferably α -zirconium phosphate or zirconium phosphate sulfoarylenphosphonate particles. The composite membrane materials are preferably prepared starting from a solution of a polymer of the state of art and from a colloidal dispersion of α -zirconium phosphate or a zirconium phosphate sulfoarylenphosphonate. The colloidal particles are transferred into the solution of the polymer preferably by mixing the dispersion with the solution or by means of phase transfer. The membrane material is preferably obtained by removing the solvent by evaporation or by a suitable non-solvent. Besides the composite membrane materials and the preparation methods, the use of the above membrane materials is claimed as ionomeric membranes with high overall performance in high temperature, especially hydrogen, and in indirect methanol fuel cells and with decreased methanol crossover in direct methanol fuel cells.